MISSOURI DEPARTMENT OF NATURAL RESOURCES
AIR AND LAND PROTECTION DIVISION
ENVIRONMENTAL SERVICES PROGRAM
Project Procedures

TITLE: Wadeable Streams Monitoring Project Procedures

EFFECTIVE DATE: December 6, 2002

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SUMMARY OF REVISIONS: Not applicable, new project procedure.

APPLICABILITY: The procedures described in this sampling protocol apply to ESP personnel who perform ambient stream monitoring in wadeable streams.

DISTRIBUTION: MoDNR Intranet
ESP SOP Coordinator
ESP WQMS Supervisor

RECERTIFICATION RECORD:

Date Reviewed				
Initials				

1.0 SCOPE AND APPLICABILITY

Environmental Services Program (ESP) personnel will sample wadeable streams as directed in the Fiscal Year Quality Assurance Project Plan (QAPP) provided by the Water Pollution Control Program (WPCP). The data collected shall be used to define "background" water quality and to assess any impairments in these smaller streams.

2.0 HEALTH AND SAFETY

2.1 Personnel shall complete a trip itinerary as part of their trip preparation and notify their supervisor. The itinerary should be updated with the Water Quality Monitoring Section (WQMS) supervisor as necessary.

2.2 Personnel should participate in the medical monitoring program in accordance with MDNR's medical monitoring policy. Those personnel routinely exposed to wastewater of domestic origin should be vaccinated for Hepatitis A as described in MDNR's Hepatitis A Prevention vaccine policy. These policies can be viewed on MDNR's intranet Health and Safety information page.

2.3 Appropriate protective gear such as waders and disposable gloves should be worn by personnel during stream surveys for protection from water-borne illnesses. It is advisable to frequently wash hands with soap and water, especially before eating and drinking anything, in addition to wearing disposable gloves.

3.0 PERSONNEL QUALIFICATIONS

Field personnel should be trained in field sample collection procedures, i.e. personnel should have taken a basic sampling workshop, the department-sponsored inspection and enforcement training, and/or been trained by an MDNR employee knowledgeable in the collection of field samples. Personnel should also be familiar with all applicable standard operating procedures.

4.0 SUPPLIES AND EQUIPMENT

The following equipment and supplies will be needed:

- sample containers
- chemical preservatives (H_2SO_4, HNO_3, HCl, etc.)
- sample labels (numbered and blank)
- Chain-of-Custody Record
- disposable gloves
- cooler(s) and ice
- flow meter and wading rod
- pH meter
- dissolved oxygen meter

- conductivity meter
- pocket thermometer
- stream discharge form(s)
- tape measure
- rebar
- hammer
- field notebook/pen
- waders
- DI water
- paper towels
- Kim Wipes

5.0 SURVEY PREPARATION

5.1 The WQMS supervisor will determine which personnel will conduct the required surveys.

5.2 ESP field personnel shall complete a trip itinerary and check out a vehicle prior to the sampling trip.

5.3 Personnel shall notify the appropriate regional office (RO) director(s) via email at least 5 days prior to the survey date. The RO director(s) should be informed that ESP personnel intend to conduct stream surveys in their region(s) and the following information should be provided:

- Environmental Specialist(s) conducting the surveys;
- date the surveys are to be completed; and
- streams to be monitored (including the counties the stream sites are in).

5.4 Personnel shall notify the Chemical Analyses Section (CAS) five days prior to sample check-in of the following information:

- number of samples
- analyses to be performed
- date of delivery
- delivery method (hand carried or delivered)

5.5 Meter checkout and readying of field supplies and other equipment is the responsibility of the Environmental Specialist(s) conducting the survey. The proper containers and preservatives needed for the required sampling should be determined (see MDNR-FSS-001 *Required/Recommended Containers, Volumes, Preservatives, Holding Times, and Special Sampling Considerations*).

5.6 A Field Sheet and Chain-of-Custody Record (COC) should be prepared prior to the survey and should accompany the samples from the time of collection until

the samples are relinquished to the sample custodian at ESP/CAS (see MDNR-FSS-002 *Field Sheet and Chain-of-Custody Record*).

5.7 For convenience, sample labels can be completed, except for the time and date, prior to the survey (see MDNR-FSS-003 *Sample Numbering and Labeling*). The labels should be kept with the COC record until they are attached to the sample containers for collection.

6.0 SURVEY IMPLEMENTATION

6.1 The Environmental Specialist(s) shall record the appropriate field documentation as follows (see MDNR-FSS-004 *Field Documentation*):

- date/time of the survey
- survey participants
- type of sampling/parameters to be analyzed
- weather conditions
- meter calibration information/property numbers
- general comments (e.g. sample color/odor, sample turbidity, etc.)

6.2 The Environmental Specialist(s) shall describe the physical characteristics of the stream including the condition of the riparian zone, land use, and substrate composition.

6.3 Macroinvertebrates, fishes, and amphibians present in the stream shall also be noted. Use of common names such as frogs, minnows, mayflies, caddisflies, etc., is sufficient for the purpose of these stream surveys. Observations can be made by turning over rocks in riffle areas or using kicknets (optional) in different habitat types. Adult aquatic macroinvertebrate species seen should also be recorded in a field notebook.

6.4 Flow measurements should be taken downstream of where the water samples will be collected to avoid inadvertently increasing turbidity in the samples and to reduce the possibility of introducing sampling bias (see MDNR-FSS-113 *Flow Measurements in Open Channels* for detailed instructions on measuring flow).

6.4.1 The stream reach selected should be flowing, straight, uniform, free of obstructions (large rocks, logs, discarded appliances, etc.), and have no turbulent flow.

6.4.2 Flow data can be recorded in a field notebook or on a stream discharge measurement form (see MDNR-FSS-113, Appendix C).

6.5 Water samples shall be collected by facing upstream to minimize the stirring up of sediment into the water column (see MDNR-FSS-005 *General Sampling*

Considerations Including the Collection of Grab, Composite, and Modified Composite Samples from Streams and Wastewater Flows). Samples should be collected before field measurements are taken in order to avoid introducing turbidity to the samples. Refer to this fiscal year's QAPP for the number of sample containers to be collected/parameters to be tested for.

6.6 Field measurements including pH, conductivity, temperature, and dissolved oxygen should be taken at the same location as the water samples were collected. Refer to the following SOPs for specific instructions on field analyses: MDNR-FSS-100 *Field Analysis of Water Samples for pH,* MDNR-FSS-101 *Field Measurement of Water Temperature,* and MDNR-FSS-102 *Field Analysis of Specific Conductance*.

7.0 HANDLING AND PRESERVATION

7.1 The sample containers should have the appropriate preservative added immediately following sample collection. Refer to MDNR-FSS-001 *Required/Recommended Containers, Volumes, Preservatives, Holding Times, and Special Sampling Considerations* to determine which preservatives are required for the parameters to be analyzed.

7.2 The containers shall be placed on ice in a cooler and remain in the possession of the sample collector until they are relinquished to the sample custodian at ESP/CAS (see MDNR-FSS-018 *Sample Handling*: *Field Handling, Transportation, and Delivery to the ESP Lab).*

7.3 After relinquishing the samples to CAS, a copy of the COC record should be made for the sample collector's records. A day or two following sample check-in, the sample collector should compare the COC with the information entered into the Sample Master database by CAS. This can be done by accessing Sample Master on the sample collector's personal computer. Any discrepancies found by the collector should be immediately reported to CAS so that the appropriate changes can be made.

8.0 QUALITY ASSURANCE/QUALITY CONTROL

8.1 Collection of duplicate field samples is required on approximately 10 percent of all samples collected for wadeable streams monitoring according to ESP policy. The data collected from these duplicate samples will be used by ESP to evaluate the accuracy and precision of field sample collection procedures (see MDNR-FSS-210 *Quality Assurance/Quality Control for Environmental Data Collection*).

8.1.1 Two sets of samples shall be collected for the requested analyses: a true sample and a duplicate sample. The results of both the true

sample and the duplicate sample will be reported to WPCP. However, the duplicate sample results will primarily be used by ESP to determine the precision of field collection methods by ESP personnel.

8.1.2 All duplicate samples should be collected in the same manner as the true sample. Duplicates should be taken as close as possible to the same location and time of collection as the true sample. The true sample containers should all be filled before filling the duplicate sample containers. The Environmental Specialist shall fill the true sample and the duplicate sample containers in the same order, i.e. if nutrients parameters are collected first for the true sample, they should be collected first for the duplicate sample as well. Duplicate field measurements shall also be collected in the same manner as the true sample.

9.0 SURVEY COMPLETION AND REPORTING

9.1 Upon completion of a wadeable streams monitoring trip, all unused supplies and equipment should be returned to the appropriate storage areas. All used meters shall be "checked in" and returned to their appropriate storage areas. Any malfunctioning meters shall be reported to the WQMS Supervisor.

9.2 Stream discharges shall be calculated using the WQMS Flow Database located on the ESP Server. The stream flows may be entered onto the COC record before the samples are relinquished to the sample custodian or they can be emailed directly to the WPCP Planning Section Supervisor after sample check-in.

9.3 All wadeable streams monitoring results will be reported by CAS and forwarded to WPCP. The sample collector will receive a copy of the sample results for his/her records. Any errors found by the Environmental Specialist should be immediately reported to the CAS so that the appropriate corrections can be made.

10.0 REFERENCES

MDNR-FSS-001 *Required/Recommended Containers, Volumes, Preservatives, Holding Times, and Special Sampling Considerations*

MDNR-FSS-002 *Field Sheet and Chain-of-Custody Record*

MDNR-FSS-003 *Sample Numbering and Labeling*

MDNR-FSS-004 *Field Documentation*

MDNR-FSS-005 *General Sampling Considerations Including the Collection of Grab, Composite, and Modified Composite Samples from Streams and Wastewater Flows*

MDNR-FSS-018 *Sample Handling: Field Handling, Transportation, and Delivery to the ESP Lab*

MDNR-FSS-100 *Field Analysis of Water Samples for pH*

MDNR-FSS-101 *Field Measurement of Water Temperature*

MDNR-FSS-102 *Field Analysis of Specific Conductance*

MDNR-WQMS-113 *Flow Measurements in Open Channels*

MDNR-FSS-210 *Quality Assurance/Quality Control for Environmental Data Collection*